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William Lomerson
Northwestern State University

Paul Tuten
Nova Southeastern University

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In Search of Alternatives: Exploring IT Evaluation from a Service-based Perspective

William L. Lomerson
Northwestern State University
lomersonw@nsula.edu

Paul M. Tuten
Nova Southeastern University
tuten@nova.edu

ABSTRACT

Information technology (IT) initiatives commonly yield unexpected, uncertain, and undesired results. Therefore, managers must either locate or devise methods for effectively evaluating IT initiatives. Unfortunately, a review of the extant literature suggests that existing methods are frequently either inappropriate or ineffective. Upon closer examination, we have found that numerous evaluation methods appear to exhibit a tendency toward a ‘product-based’ view of information technology while ignoring its ‘service-based’ dimensions. Given that information systems are primarily social systems that interact with end-users, evaluation of these systems should also include the service-based elements. In this paper, we discuss our ongoing research efforts to examine the link between IT-based activities and organizational value creation, as well as appropriate methods to evaluate this IT value chain. Our initial observations suggest that the inclusion of service-oriented evaluation techniques would result in more holistic and contextual—thus, arguably more effective—IT evaluation methodologies.

Keywords

IS/IT evaluation, measurement, IT-based activities, value chain analysis

INTRODUCTION

In this paper, we introduce our research program to examine the link between IT-based activities and organizational value creation, as well as methodologies appropriate for the evaluation of IT value chains. While still early in our work, we have come to believe that most existing evaluation techniques exhibit a bias toward a “product-based” view of information technology while ignoring its “service-based” dimension. To begin, we explore the view that IT investments may yield uncertain and unexpected outcomes. Next we provide a definition of “value” and then review the process by which IT activities create organizational value. We then briefly discuss existing evaluation methods suitable to both product-based and service-based views of IT. Finally, we summarize our assessment in a statement of problem and briefly describe our research objectives.

IT Investments and Uncertain Outcomes

Organizations adopt IT in order to achieve a myriad of objectives, ranging from the reduction of expense to the creation of competitive advantage. Despite widespread investment in IT, many business leaders and academic researchers have questioned its ability to add value to organizations; moreover, the literature suggests that corporate managers frequently “whipsaw between viewing IT as a source of major differentiation” and “begrudgingly viewing it as a cost of doing business” (Leibs 2002). Recent studies have demonstrated the ability of IS/IT investments to provide positive economic and financial returns (Anderson et al. 2002; Bharadwaj et al. 1999; Brynjolfsson and Yang 1999). Nevertheless, according to Brynjolfsson, the effect of IT investments varies at the level of the individual firm (Leibs 2002). Anecdotal evidence found in the literature supports this assertion. American Airlines (Copeland and McKenny 1988), Xerox (Remenyi 1991), Dell (McKinsey Global Institute 2001), and Wal-Mart (Devaraj and Kohli 2002) all provide examples of tremendous value being derived from IT initiatives. Regrettably, spectacular failures also abound such as the case of the FoxMeyer Drug Corporation (Ehrhart 2002) and the dot-com meltdown of firms like Boo.com (Malmsten et al. 2001).

Defining Value

Before turning to a discussion of value creation and measurement, it seems appropriate to first define the meaning of the term “value” in the context of this paper. Traditionally, productivity and other similar measures have been used to evaluate a firm’s performance improvements. In general, such measures have been limited to tangible and easily measurable outcomes and do not address intangible, non-financial benefits to the firm, such as improved service quality or customer support. As such, these measures generally fail to account for customer/consumer originated value.

Byrnjolfsson, a leading researcher in the examination of IT productivity, observed that much of the benefit provided by IT comes from new uses developed directly by end-users (Leibs 2002). These benefits “ultimately lead to significantly greater shareholder return than the ones that are focused purely on cost-cutting and management control,” the latter being the focus of most traditional performance measures. Byrnjolfsson, while confirming the difficulty of identifying and measuring these intangible benefits, noted that his previous studies found that up to 90 percent of the benefits associated with IT were intangible.

To deal with the intractable nature of intangibles, Byus and Lomerson (2004) have proposed a metric based on consumer-value that unifies theoretically the concept of value as it has been used and understood in the disciplines of marketing, organizational analysis, and economics. This metric can be used to provide a consistent and comparable measure of both tangible and intangible outcomes of an organization. The notion of value as a performance measure is compelling because it is directly associated with the benefits received by the consumer. However, in order to employ this metric, a holistic conceptual framework must be developed to link IT investments with the beneficial outcomes sought by an organization.

IT ACTIVITIES AND VALUE CREATION

To measure IT performance with respect to its contribution to organizational performance, it is necessary to understand how IT contributes to organizational performance. According to Kim and Kim (2001), organizations may be viewed as a collection of processes that are implemented to support and satisfy the needs of both internal and external customers. These organizational processes ultimately create outcomes that are consumed by external customers, thereby creating value for the organization. When a product or a service is provided directly to an external customer, consumption serves as the measure of organizational success. However, for internal consumers, the consumption of a product or service is not an equivalent measure of success. Instead, the appropriate measure is the increased capability of the internal consumer to provide a product or service to an external customer. More problematic is the identification and measurement of value in those organizational activities that produce intangible outcomes that are indirectly consumed by external customers, such as marketing activities.

In examining information technology’s ability to add incremental value to an organization, one must first understand the activities associated with IT within the context of a firm. These activities may be either internal consumer or external customer focused, as well as either product or service oriented. In addition, these activities are linked to form an IT value chain across a firm (Ward and Peppard 2002). For example, an IT organization may develop a supply chain management platform that is then provided as a service to the firm’s business units. As internal consumers of the supply chain management system, the business units may use this application to both produce products (such as inventory reports) and to perform services (such as optimizing the just-in-time manufacturing process). Ultimately, the supply chain management system may increase the firm’s ability to deliver the products that its external customers want, as well as its ability to deliver those products when demanded. Such a scenario could provide the firm with a competitive advantage (whether transient or long-term), thereby potentially increasing the firm’s profitability.

In short, the derivation of value from IT investments results from a sequence of IT-based activities, an IT value chain. What is more, these value chains are frequently complex and protracted. Under these circumstances, the measurement of value derived, or likely to be derived, from IT investments represents a challenging task. This view concurs with Smithson and Hirschheim’s (1998) assertion that IT evaluation “clearly remains a thorny problem” of significant importance.

EVALUATION METHODS & THE IT VALUE CHAIN

In our preliminary examination of the extant literature, we have found a number of evaluation methods that focus on IT as a product, assess the process of IT production, or are mostly used in evaluating IT products (despite being seemingly applicable to services). For instance, some methods focus on cost and effort estimation techniques, such as COCOMO (Boehm, 1981). Other methods attempt to assess the quality or maturity of the IS development process (e.g. ISO 9000/9001, Capability Maturity Model) and the IS as a product (Finkelstein 1989; Zultner 1993). Usability assessments attempt to also improve product quality but generally fail to extend to improving the underlying business process. Many methods originating in finance are also frequently employed for IT product evaluation, such as return on investment, net present value, and internal rate of return (Serafeimidis 2002). The results of these finance-based methods, however, often appear incomplete or erratic due to the intangible benefits that frequently accompany the tangible outcomes being measured. In other cases, IT managers may use ratio methods, such as Strassmann’s (1985) Return on Management (ROM) method. Moreover, IT product investments may be viewed collectively via portfolio methods, such as portfolio mapping (Willcocks 1994) and Balanced Scorecard (Kaplan and Norton 1996).

Conversely, we have found relatively few methods explicitly designed for, or commonly utilized in the process of, evaluating IT as a service. One example of such a method is SERVQUAL, which evaluates IT performance with respect to the

consumption of IT services. Yet while SERVQUAL has received substantial attention from IS academicians as a tool to measure IT department performance, it has not been convincingly demonstrated to serve as a managerially effective diagnostic tool (Kang and Bradley 2002). Moreover, SERVQUAL measures only one dimension of the performance of an IT department; indeed, we have found no documented conceptual or theoretical linkages of this measure to overall organizational performance.

Why have traditional performance measures proven difficult to apply to IT performance? Kang and Bradley (2002) argued that because traditional methods are primarily based on products that are tangible, homogeneous and separable from their production and consumption, they don't transfer well to service delivery which is intangible, heterogeneous, and simultaneously produced and consumed. In addition, Nambisan's (2001) examination of software service businesses vs. software product businesses suggested that differences between each segment are substantial enough that they inhibit/prevent a business in one segment from expanding successfully into the other segment. Nambisan's finding may help to explain why product-oriented IT departments often fail to adequately evaluate service-based IT activities, thereby ignoring critical components of many organizations' IT value chain.

STATEMENT OF PROBLEM

To summarize, while the literature suggests that IT investments provide positive economic returns and increased productivity in general, it remains equally clear that individual IT projects at the firm-level continue to yield economically unpredictable results. Given that the purpose of IT investment is to add value to an organization, firms must undertake evaluations using appropriate measures to predict or review the outcomes derived from such investments. To successfully measure value, however, one must first understand the activities from which value creation emanates. Specifically, the linkages between IT performance and organizational performance must be understood.

Given our understanding of IT value chains, which frequently involve a complex and protracted series of activities, we have come to question whether or not existing evaluation methods are robust enough to handle such contextual richness. We are not alone in this assessment. The extant literature is chock-a-block with researchers who claim that many of the existing evaluation tools and techniques are inadequate. Indeed, many authors have called for interpretive—more contextually sensitive—alternatives to traditional IS/IT evaluation approaches (Irani and Love 2001; Jones et al. 2001; Serafeimidis and Smithson 2000; Serafeimidis 2002; Smithson and Hirschheim 1998; Tuten 2003; Walsham 1999). Furthermore, researchers have demonstrated that IT investment decisions frequently result in poor and unexpected outcomes, thereby suggesting a failure on the part of existing measurement and evaluation methods and/or the practitioners conducting evaluations. Given such overwhelming evidence, the investigation of new, more holistic approaches to IS/IT evaluation seems warranted.

Our initial review of the extant literature highlighted a tendency of evaluation methods to privilege product-based, as opposed to service-based, views of IT. This observation, if confirmed, could help to explain why existing evaluation practices frequently fail to accurately predict or reveal the organizational value derived from IT investments. Why could this be the case? Returning to our earlier discussion of IT-based activities providing organizational value, recall that organizational value is derived from a pattern of product and service use that in due course results in an external customer consuming a product or service provided by the organization. Accordingly, an IT product cannot directly deliver organizational value unless it is consumed (e.g. commercial off-the-shelf software in the case of a software development company), or used in the immediate process of consumption (e.g. an e-commerce web site in the case of a retail business), by an external customer.

Research Objectives

Based upon the above discussion, we have defined a series of objectives for our research program:

1. Develop a taxonomy that details existing evaluation methods and describes each technique's ability to assess the outcomes of IT-based activities. Existing evaluation methods will be classified and presented in a comprehensive framework.
2. Perform a "gap analysis" to discover deficiencies where existing evaluation techniques may fail to adequately assess a category of IT-based activities. In particular the analysis will focus on the applicability of these methods to product-based vs. service-based views of IT.
3. Develop and/or refine a conceptual framework that explicitly links IT performance with organizational performance through the value chain of IT-based activities across both product-based and service-based dimensions.
4. Develop an evaluation model that applies one or more measurement and evaluation techniques to each phase of the conceptual framework across both product-based and service-based dimensions.

Currently, we are actively engaged in addressing the first two aims of our research program.

CONCLUSION

In this paper, we have discussed our ongoing research efforts to examine the link between IT-based activities and organizational value creation, as well as appropriate methods to evaluate this IT value chain. While still early in our research program, we have come to believe that most evaluation techniques appear to exhibit a tendency toward a ‘product-based’ view of information technology while ignoring its “service-based” dimension. Given this information, the investigation of new approaches to IS/IT evaluation seems warranted. Specifically, the addition of service-oriented measurement and evaluation techniques could result in more holistic and contextual—thus, arguably more effective—IT evaluation practices.

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